



TORQ Analysis of Computer Programmers to Computer Software Engineers, Systems Software

INPUT SECTION:

Transfer	Title	O*NET	Filters		
From Title:	Computer Programmers	15-1021.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Computer Software Engineers, Systems Software	15-1032.00	Skills:	Importance Level: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

OUTPUT SECTION:

Grand TORQ:

88

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	90	Level	85	Level	88

Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add			
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt
Number Facility	57	45	50	Mathematics	79	19	77	Engineering and Technology	70	27	76
Mathematical Reasoning	57	22	65	Technology Design	81	15	92	Design	70	20	70
Speech Clarity	50	13	56	Systems Analysis	78	14	79	Customer and Personal Service	65	12	69
Speech Recognition	48	11	59	Troubleshooting	82	12	92	Mathematics	74	10	78
Deductive Reasoning	66	7	75	Complex Problem Solving	84	10	95	English Language	67	9	77
Problem Sensitivity	57	6	68	Reading Comprehension	81	10	81	Computers and Electronics	96	7	98
Oral Expression	66	4	68	Active Learning	84	7	85				
Fluency of Ideas	50	2	50	Active Listening	69	4	70				
Category Flexibility	48	2	50	Critical Thinking	83	1	89				
Perceptual Speed	35	1	50	Programming	78	1	82				

LEVEL and IMPT (IMPORTANCE) refer to the Target Computer Software Engineers, Systems Software. GAP refers to level difference between Computer Programmers and Computer Software Engineers, Systems Software.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Computer Programmers	Computer Software Engineers, Systems Software	Importance
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Deductive Reasoning	59	66	75
Inductive Reasoning	55	55	72
Oral Comprehension	66	64	68
Oral Expression	62	66	68
Problem Sensitivity	51	57	68
Information Ordering	67	59	68
Mathematical Reasoning	35	57	65
Near Vision	59	59	65
Written Comprehension	66	64	62
Originality	53	48	62
Speech Recognition	37	48	59
Written Expression	66	57	56
Speech Clarity	37	50	56
Selective Attention	42	41	53
Fluency of Ideas	48	50	50
Category Flexibility	46	48	50
Number Facility	12	57	50
Perceptual Speed	34	35	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Computer Programmers	Computer Software Engineers, Systems Software	Importance
Complex Problem Solving	74	84	95
Technology Design	66	81	92
Troubleshooting	70	82	92
Critical Thinking	82	83	89
Active Learning	77	84	85
Programming	77	78	82
Reading Comprehension	71	81	81
Systems Analysis	64	78	79
Mathematics	60	79	77
Operations Analysis	77	75	72
Active Listening	65	69	70

Knowledge Level Comparison - Knowledge with importance scores over 69



Description	Computer Programmers	Computer Software Engineers, Systems Software	Importance
Computers and Electronics	89	96	98
Mathematics	64	74	78
English Language	58	67	77
Engineering and Technology	43	70	76
Design	50	70	70
Customer and Personal Service	53	65	69

Experience & Education Comparison

Related Work Experience Comparison			Required Education Level Comparison		
Description	Computer Programmers	Computer Software Engineers, Systems Software	Description	Computer Programmers	Computer Software Engineers, Systems Software
10+ years	20%	22%	Doctoral	17%	11%
8-10 years	0%	7%	Professional Degree	0%	0%
6-8 years	2%	11%	Post-Masters Cert	0%	0%
4-6 years	0%	5%	Master's Degree	0%	19%
2-4 years	34%	30%	Post-Bachelor Cert	0%	6%
1-2 years	29%	14%	Bachelors	63%	19%
6-12 months	3%	8%	AA or Equiv	4%	27%
3-6 months	0%	0%	Some College	10%	2%
1-3 months	5%	0%	Post-Secondary Certificate	0%	0%
0-1 month	0%	0%	High School Diploma or GED	0%	11%
None	3%	0%	No HSD or GED	3%	0%

Computer Programmers

Computer Software Engineers, Systems Software

Most Common Educational/Training Requirement:

Bachelor's degree

Bachelor's degree

Job Zone Comparison

4 - Job Zone Four: Considerable Preparation Needed

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A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.

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Most of these occupations require a four - year bachelor's degree, but some do not.

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Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

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Tasks

Computer Programmers

Computer Software Engineers, Systems Software



Core Tasks

Generalized Work Activities:

- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Organizing, Planning, and Prioritizing Work - Developing specific goals and plans to prioritize, organize, and accomplish your work.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.

Specific Tasks

Occupation Specific Tasks:

- Assign, coordinate, and review work and activities of programming personnel.
- Collaborate with computer manufacturers and other users to develop new programming methods.
- Compile and write documentation of program development and subsequent revisions, inserting comments in the coded instructions so others can understand the program.
- Conduct trial runs of programs and software applications to be sure they will produce the desired information and that the instructions are correct.
- Consult with and assist computer operators or system analysts to define and resolve problems in running computer programs.
- Consult with managerial, engineering, and technical personnel to clarify program intent, identify problems, and suggest changes.
- Correct errors by making appropriate changes and rechecking the program to ensure that the desired results are produced.
- Investigate whether networks, workstations, the central processing unit of the system, or peripheral equipment are responding to a program's instructions.
- Perform or direct revision, repair, or expansion of existing programs to increase operating efficiency or adapt to new requirements.
- Perform systems analysis and programming tasks to maintain and control the use of computer systems software as a systems programmer.

Core Tasks

Generalized Work Activities:

- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Analyzing Data or Information - Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.
- Organizing, Planning, and Prioritizing Work - Developing specific goals and plans to prioritize, organize, and accomplish your work.

Specific Tasks

Occupation Specific Tasks:

- Advise customer about, or perform, maintenance of software system.
- Analyze information to determine, recommend and plan installation of a new system or modification of an existing system.
- Confer with data processing and project managers to obtain information on limitations and capabilities for data processing projects.
- Consult with customers or other departments on project status, proposals and technical issues such as software system design and maintenance.
- Consult with engineering staff to evaluate interface between hardware and software, develop specifications and performance requirements and resolve customer problems.
- Coordinate installation of software system.
- Design and develop software systems, using scientific analysis and mathematical models to predict and measure outcome and consequences of design.
- Develop and direct software system testing and validation procedures.
- Direct software programming and development of documentation.
- Evaluate factors such as reporting formats required, cost constraints, and need for security restrictions to determine hardware configuration.
- Modify existing software to correct errors, to adapt it to new hardware or to upgrade interfaces and improve performance.



- Prepare detailed workflow charts and diagrams that describe input, output, and logical operation, and convert them into a series of instructions coded in a computer language.
- Train subordinates in programming and program coding.
- Write or contribute to instructions or manuals to guide end users.
- Write, analyze, review, and rewrite programs, using workflow chart and diagram, and applying knowledge of computer capabilities, subject matter, and symbolic logic.
- Write, update, and maintain computer programs or software packages to handle specific jobs such as tracking inventory, storing or retrieving data, or controlling other equipment.

Detailed Tasks

Detailed Work Activities:

- adjust computer operation system
- analyze workflow
- assist co-workers with software problems
- communicate technical information
- configure computers in industrial or manufacturing setting
- consult with customers concerning needs
- consult with managerial or supervisory personnel
- design computer hardware or software interface
- design computer programs or programming tools
- develop computer performance standards
- develop mathematical or computer languages
- develop or maintain databases
- develop records management system
- develop tables depicting data
- direct and coordinate activities of workers or staff
- distinguish details in graphic arts material
- encode equations for processing
- evaluate computer system user requests or requirements
- follow data security procedures
- follow data storage procedures
- identify color or balance
- implement computer system changes
- install computer programs
- maintain client-server database
- maintain or repair computers or related equipment
- monitor computer operation
- prepare instruction manuals

- Monitor functioning of equipment to ensure system operates in conformance with specifications.
- Prepare reports and correspondence concerning project specifications, activities and status.
- Recommend purchase of equipment to control dust, temperature, and humidity in area of system installation.
- Specify power supply requirements and configuration.
- Store, retrieve, and manipulate data for analysis of system capabilities and requirements.
- Supervise and assign work to programmers, designers, technologists and technicians and other engineering and scientific personnel.
- Train users to use new or modified equipment.
- Utilize microcontrollers to develop control signals, implement control algorithms and measure process variables such as temperatures, pressures and positions.

Detailed Tasks

Detailed Work Activities:

- adjust computer operation system
- advise clients regarding engineering problems
- analyze technical data, designs, or preliminary specifications
- check hardware or software to determine reliability
- communicate technical information
- conduct performance testing
- confer with management or users
- consult with customers concerning needs
- design computer hardware or software interface
- design control systems
- design data processing systems
- design data security systems
- design electronic equipment
- design hardware or software systems
- design systems in cooperation with colleagues
- develop computer performance standards
- develop mathematical or computer languages
- develop or maintain databases
- develop tables depicting data
- evaluate computer system user requests or requirements
- evaluate prototype computer software systems
- follow data security procedures
- follow data storage procedures



- prepare technical reports or related documentation
- prepare workflow chart
- program computers for electronic engineering applications
- program computers for management analysis applications
- program computers for medical applications
- program computers for social science applications
- program computers using existing software
- program mainframe computer
- provide customer service
- provide technical computer training
- provide technical support to computer users
- recommend software or hardware purchases
- resolve computer program operational problems
- resolve symbolic formulations in data processing applications
- revise or correct errors in computer programs, software, or systems
- supervise programming personnel
- test computer programs or systems
- test data communications hardware or software
- use computer application flow charts
- use computer graphics design software
- use computer programming language
- use computers to enter, access or retrieve data
- use creativity in graphics
- use differential equations in computer programming
- use geographical information system (GIS) software
- use graphic arts techniques
- use interpersonal communication techniques
- use knowledge of mainframe computers
- use object-oriented computer programming techniques
- use project management techniques
- use relational database software
- use spreadsheet software
- use structural analysis techniques to analyze computer systems
- use word processing or desktop publishing software
- write computer software, programs, or code
- write documentation for computer programming

- follow statistical process control procedures
- make presentations
- prepare technical reports or related documentation
- program computers for electronic engineering applications
- program mainframe computer
- provide technical computer training
- read blueprints
- read manufacturing outlines for electronic products
- read schematics
- read technical drawings
- recommend purchase, repair, or modification of equipment
- recommend software or hardware purchases
- resolve engineering or science problems
- revise or correct errors in computer programs, software, or systems
- test computer programs or systems
- train workers in use of equipment
- understand detailed electronic design specifications
- understand engineering data or reports
- use computer networking technology
- use computer programming language
- use computers to enter, access or retrieve data
- use knowledge of mainframe computers
- use project management techniques
- use scientific research methodology
- use spreadsheet software
- write business correspondence
- write computer software, programs, or code
- write documentation for computer programming
- write technical specifications for computer systems, software or applications

Technology - Examples

Administration software

- Software distribution management software

Analytical or scientific software

- Data analysis software

- Dynamic modeling software

- SAS software

- Simulation program with integrated circuit emphasis SPICE

- The MathWorks Simulink



Technology - Examples

Analytical or scientific software

- SAS software
- Simulation program with integrated circuit emphasis SPICE

Application server software

- Application server software
- IBM WebSphere

Charting software

- Microsoft Office Visio

Compiler and decompiler software

- Code generator software
- Command interpreters
- Compilers
- Decomilers
- Incremental compiler software
- Inline code expander software
- Interpreter software
- Just-in-time compiler
- Mixed code generator
- One pass compiler software
- Partial class generator software
- Retargetable compiler
- Stage compiler
- Threaded code compiler
- Xerces2 Java Parser

Configuration management software

- IBM Rational ClearCase
- Revision control software

Content workflow software

- Workflow software

Data base management system software

- CAST SQL Builder
- Computer Associates integrated data management system CA-IDMS
- Data definition language DDL

THE NETWORKS CHAIN

Application server software

- BEA WebLogic Server
- IBM WebSphere
- Oracle Application Server

Backup or archival software

- Backup and archival software

Computer aided design CAD software

- Computer assisted software engineering CASE software

Configuration management software

- Automated installation software
- Configuration management software
- Deployment software
- IBM Rational ClearCase
- Patch management software
- Visible Razor

Data base management system software

- Computer Associates integrated data management system CA-IDMS
- Data definition language DDL
- Data manipulation language DML
- Database management software
- Distributed database management software
- IBM DB2
- Microsoft Access
- Microsoft SQL Server
- Microsoft transact-structural query language T-SQL
- MySQL software
- Oracle procedural language/structured query language PL/SQL
- Relational database management software
- Sybase SQL Server

Data base reporting software

- DataVision software

Data base user interface and query software

- Structured query language SQL



- Data manipulation language DML

- dBase Plus

- IBM DB2

- Microsoft Access

- Microsoft SQL Server

- mSQL software

- MySQL software

- Oracle procedural language/structured query language PL/SQL

- Pick software

- Relational database management software

- Sybase SQL Server

Data base reporting software

- ReCrystallize Crystal Reports

Data base user interface and query software

- Structured query language SQL

Development environment software

- A programming language APL

- Activity based costing ABC

- Ada

- Adobe Systems Adobe PostScript

- Algorithmic language ALGOL

- American National Standards Institute ANSI C

- Assembler

- AWK

- B

- Basic combined programming language BCPL

- Beginner's all-purpose symbolic instruction code BASIC

- Borland Delphi software

- C

- Class oriented ring associated language CORAL

- Clipper

- CLU

- Code munger software

Development environment software

- A programming language APL

- Activity based costing ABC

- Ada

- Algorithmic language ALGOL

- American National Standards Institute ANSI C

- Assembler

- AWK

- B

- Basic combined programming language BCPL

- Beginner's all-purpose symbolic instruction code BASIC

- Borland Delphi software

- Borland JBuilder

- C

- Class oriented ring associated language CORAL

- CLU

- Combined programming language CPL

- Common business oriented language COBOL

- Eclipse software

- Embedded systems development software

- Extensible markup language XML

- Extensible stylesheet language transformations XSLT

- Flow-Matic

- Formula translation/translator FORTRAN

- FORTH

- Haskell

- IBM Rational Rose XDE Developer D93

- Icon

- Integrated development environment IDE software

- Interface definition language IDL

- J

- Kernel



- Combined programming language CPL
- Common business oriented language COBOL
- Eclipse software
- Extensible markup language XML
- Extensible stylesheet language XSL
- Flow-Matic
- Formula translation/translator FORTRAN
- FORTH
- Haskell
- Icon
- Interface definition language IDL
- J
- Kernel
- List processing language LISP
- Logo
- Microsoft .NET Framework
- Microsoft Extensible Application Markup Language (XAML)
- Microsoft Visual Basic
- Microsoft Visual Basic Scripting Edition VBScript
- Microsoft Visual Studio
- ML
- MUMPS M
- Parlog
- Pascal
- Programming language one PL/I
- Prolog
- Restructured extended executor REXX
- Ruby
- Scheme
- Source code migration software
- String oriented symbolic language SNOBOL
- Symantec Visual Caf

- Kernel
- List processing language LISP
- Microsoft Visual Basic
- Microsoft Visual Basic Scripting Edition VBScript
- Microsoft Visual Studio
- ML
- MUMPS M
- Parlog
- Pascal
- Programming language one PL/I
- Prolog
- Restructured extended executor REXX
- Ruby
- Scheme
- String oriented symbolic language SNOBOL
- Sun Microsystems Java 2 Platform Enterprise Edition J2EE
- Symantec Visual Caf
- Web service definition language WDSL

Device drivers or system software

- Microsoft DirectX

Document management software

- Document management software

Electronic mail software

- Email software

Enterprise application integration software

- Enterprise application integration EAI software
- SAP Netweaver

File versioning software

- Version control software

Filesystem software

- File server software

Graphical user interface development software

- Graphical user interface GUI design software

Graphics or photo imaging software

- Open Graphics Library OpenGL

Network operation system software



- Tier generator software

- Web service definition language WDSL

Document management software

- Virage VS Archive

Enterprise resource planning ERP software

- Advanced business application programming ABAP

Graphical user interface development software

- Basis BBx VisualPRO/5

- Graphical user interface GUI development software

Object or component oriented development software

- BETA

- C++

- Categorical abstract machine language CAML

- Common extended self-containing prolog CESP

- DRAGOON software

- E++

- Eiffel

- Emerald

- Extended self-containing Prolog ESP

- Greatis Object Inspector

- Lisp object-oriented programming system LOOPS

- Microsoft Visual Basic.NET

- Microsoft Visual C# .NET

- Modula

- Oberon

- Objective-C

- Oblog

- Polka

- PowerSoft PowerBuilder

- Practical extraction and reporting language Perl

- Python

- Sather

- IBM z/OS operating systems

- Novell network software

Object or component oriented development software

- BETA

- C++

- Categorical abstract machine language CAML

- Common extended self-containing prolog CESP

- Component object model COM software

- Distributed component object model DCOM software

- Document Object Model DOM Scripting

- DRAGOON software

- E++

- Eiffel

- Emerald

- Extended self-containing Prolog ESP

- Lisp object-oriented programming system LOOPS

- Microsoft Visual Basic.NET

- Microsoft Visual C# .NET

- Modula

- Oberon

- Object or component oriented development software

- Objective-C

- Oblog

- Polka

- Practical extraction and reporting language Perl

- Python

- Sather

- Self

- Simple API for XML SAX

- Simulation language SIMULA

- Smalltalk



- Self

- Simulation language SIMULA

- Smalltalk

- Sun Microsystems Java

Object oriented data base management software

- Microsoft Visual FoxPro

Operating system software

- Bourne Shell

- Job control language JCL

Program testing software

- Debugging software

- Low-level debugger software

- Source code editor software

- Symbolic debugger software

Project management software

- Microsoft Project

Requirements analysis and system architecture software

- Unified modeling language UML

Spreadsheet software

- Microsoft Excel

Transaction server software

- Customer information control system CICS software

Web platform development software

- Adobe Systems Adobe Cold Fusion

- Adobe Systems Adobe Flex

- Apache Struts

- Asynchronous JavaScript and XML AJAX

- Cascading Style Sheets CSS

- Hypertext markup language HTML

- JavaScript

- Microsoft Active Server Pages ASP

- Microsoft ASP.NET

- Microsoft Silverlight

- Microsoft Visual C#

- Sun Microsystems Java

Operating system software

- Apple Macintosh OS/X

- Cisco Systems IOS

- Disk operating system DOS software

- Hewlett-Packard HP OpenVMS

- IBM AIX

- Job control language JCL

- Linux

- Magellan Firmware

- Microsoft Windows

- MVS software

- Novell Linux

- Operating system shells

- QNX software

- Real time operating system RTOS software

- Sun Microsystem Solaris

- UNIX

- VxWorks software

- Win CE

Platform interconnectivity software

- Migration software

Presentation software

- Microsoft PowerPoint

Program testing software

- Defect tracking software

- Dynamic analysis software

- Fault testing software

- Functional testing software

- IBM Rational ClearQuest

- IBM Rational PurifyPlus

- Integration testing software

- Interoperability testing software

- Load testing software



- PHP: Hypertext Preprocessor

- Ruby on Rails

- Sun Microsystems Java server pages JSP

Word processing software

- Microsoft Word

Tools - Examples

- Computer servers

- Desktop computers

- Mainframe computers

- Serial port cards

- Mercury Interactive LoadRunner

- Mercury Interactive WinRunner

- Migration testing software

- Mutation testing software

- Recovery testing software

- Regression testing software

- Security testing software

- Static analysis software

- Stress testing software

- System testing software

- Test design software

- Test implementation software

- Unit testing software

Project management software

- Microsoft Project

Requirements analysis and system architecture software

- IBM Rational Requisite Pro

- Requirements management software

- Unified modeling language UML

Spreadsheet software

- Microsoft Excel

Storage networking software

- Storage area network SAN software

Transaction security and virus protection software

- Encryption software

Transaction server software

- Apache software

- Customer information control system CICS software

- IBM Middleware

- Microsoft Internet Information Service IIS

- Object Management Group Object Request Broker

- Web server software

Web platform development software



- Adobe Systems Adobe Flex
 - Allaire ColdFusion
 - Apache Struts
 - Extensible HyperText Markup Language XHTML
 - Hypertext markup language HTML
 - JavaScript
 - Microsoft Active Server Pages ASP
 - PHP: Hypertext Preprocessor
 - Ruby on Rails
 - Sun Microsystems Java server pages JSP
- Word processing software
- Microsoft Word

Tools - Examples

- Graphics processing unit GPU
- Application servers
- Desktop computers
- Directory servers
- In circuit emulators ICE
- Mainframe computers
- Notebook computers
- Personal digital assistants PDA

Labor Market Comparison

Description	Computer Programmers	Computer Software Engineers, Systems Software	Difference
Median Wage	\$ 58,240	\$ 73,410	\$ 15,170
10th Percentile Wage	\$ 39,650	\$ 51,700	\$ 12,050
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$ 77,420	\$ 85,280	\$ 7,860
90th Percentile Wage	\$ 95,710	\$ 97,040	\$ 1,330
Mean Wage	\$ 62,540	\$ 72,930	\$ 10,390
Total Employment - 2007	720	290	-430
Employment Base - 2006	761	310	-451



Projected Employment - 2016	670	343	-327
Projected Job Growth - 2006-2016	-11.9 %	10.7 %	22.6 %
Projected Annual Openings - 2006-2016	16	8	-8

National Job Posting Trends

Trend for Computer Programmers

Trend for
Computer
Software
Engineers,
Systems
Software

Job Trends from Indeed.com

— Computer Programmer — Systems Software Engineer

Data from [Indeed](#)

Recommended Programs

Artificial Intelligence and Robotics

Artificial Intelligence and Robotics. A program that focuses on the symbolic inference, representation, and simulation by computers and software of human learning and reasoning processes and capabilities, and the modeling of human motor control and motions by computer-driven machinery. Includes instruction in computing theory, cybernetics, human factors, natural language processing, robot design, and applicable aspects of engineering, technology, and specific end-use applications.

No schools available for the program

Information Technology

Information Technology. A program that focuses on the design of technological information systems, including computing systems, as solutions to business and research data and communications support needs. Includes instruction in the principles of computer hardware and software components, algorithms, databases, telecommunications, user tactics, application testing, and human interface design.

Institution	Address	City	URL
University of Maine		Orono	www.umaine.edu/

Programming



Computer Programming/Programmer, General. A program that focuses on the general writing and implementation of generic and customized programs to drive operating systems and that generally prepares individuals to apply the methods and procedures of software design and programming to software installation and maintenance. Includes instruction in software design, low- and high-level languages and program writing; program customization and linking; prototype testing; troubleshooting; and related aspects of operating systems and networks.

Institution	Address	City	URL
Washington County Community College	One College Drive	Calais	www.wccc.me.edu
Northern Maine Community College	33 Edgemont Dr	Presque Isle	www.nmcc.edu

Information Sciences and Systems

Information Science/Studies. A program that focuses on the theory, organization, and process of information collection, transmission, and utilization in traditional and electronic forms. Includes instruction in information classification and organization; information storage and processing; transmission, transfer, and signaling; communications and networking; systems planning and design; human interfacing and use analysis; database development; information policy analysis; and related aspects of hardware, software, economics, social factors, and capacity.

Institution	Address	City	URL
Eastern Maine Community College	354 Hogan Rd	Bangor	www.emcc.edu

Computer Science

Computer Science. A general program that focuses on computers, computing problems and solutions, and the design of computer systems and user interfaces from a scientific perspective. Includes instruction in the principles of computational science, and computing theory; computer hardware design; computer development and programming; and applications to a variety of end-use situations.

Institution	Address	City	URL
Bowdoin College	5700 College Station - President's Office	Brunswick	www.bowdoin.edu
Bowdoin College	5700 College Station - President's Office	Brunswick	www.bowdoin.edu
University of Maine at Farmington	224 Main St	Farmington	www.umf.maine.edu
University of Maine at Farmington	224 Main St	Farmington	www.umf.maine.edu
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu
Colby College	Mayflower Hill Drive	Waterville	www.colby.edu
Colby College	Mayflower Hill Drive	Waterville	www.colby.edu

Computer Engineering

Computer Engineering, General. A program that generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of computer hardware and software systems and related equipment and facilities; and the analysis of specific problems of computer applications to various tasks.



Institution	Address	City	URL
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
Computer Engineering Technologies/Technicians, Other			
Computer Engineering Technologies/Technicians, Other. Any instructional program in computer engineering technologies not listed above.			
No schools available for the program			

Maine Statewide Promotion Opportunities for Computer Programmers								
O* NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings
15-1021.00	Computer Programmers	100	4	720	\$58,240.00	\$0.00	-12%	16
15-1031.00	Computer Software Engineers, Applications	89	4	1,060	\$63,750.00	\$5,510.00	30%	47
15-1032.00	Computer Software Engineers, Systems Software	88	4	290	\$73,410.00	\$15,170.00	11%	8
15-1051.00	Computer Systems Analysts	86	4	1,650	\$69,340.00	\$11,100.00	20%	78
15-1061.00	Database Administrators	83	4	300	\$60,260.00	\$2,020.00	20%	11
15-1081.00	Network Systems and Data Communications Analysts	79	3	610	\$59,790.00	\$1,550.00	47%	54
15-2031.00	Operations Research Analysts	78	5	180	\$64,140.00	\$5,900.00	12%	6
11-3021.00	Computer and Information Systems Managers	78	5	870	\$83,130.00	\$24,890.00	8%	21
17-2071.00	Electrical Engineers	77	4	260	\$73,050.00	\$14,810.00	-10%	6
13-2051.00	Financial Analysts	76	4	210	\$71,380.00	\$13,140.00	10%	4
17-2072.00	Electronics Engineers, Except Computer	76	4	210	\$76,420.00	\$18,180.00	-26%	4
13-2052.00	Personal Financial Advisors	74	3	360	\$94,100.00	\$35,860.00	10%	13



19-1041.00	Epidemiologists	73	5	20	\$58,250.00	\$10.00	20%	1
17-2112.00	Industrial Engineers	73	4	580	\$68,350.00	\$10,110.00	11%	22
25-1054.00	Physics Teachers, Postsecondary	72	5	50	\$68,770.00	\$10,530.00	10%	2

Top Industries for Computer Software Engineers, Systems Software

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Computer systems design and related services	541500	26.70%	93,449	138,789	48.52%
Software publishers	511200	6.13%	21,472	30,412	41.63%
Computer and peripheral equipment manufacturing	334100	5.73%	20,064	14,446	-28.00%
Data processing, hosting, and related services	518200	4.70%	16,465	24,485	48.71%
Research and development in the physical, engineering, and life sciences	541710	4.57%	16,011	18,790	17.36%
Professional and commercial equipment and supplies merchant wholesalers	423400	3.48%	12,195	15,637	28.23%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	3.40%	11,892	12,524	5.31%
Wired telecommunications carriers	517100	3.26%	11,407	9,850	-13.64%
Management, scientific, and technical consulting services	541600	3.02%	10,577	20,770	96.38%
Management of companies and enterprises	551100	2.61%	9,150	11,603	26.81%
Federal government, excluding postal service	919999	2.54%	8,900	9,255	3.99%
Internet service providers and Web search portals	518100	2.12%	7,407	5,776	-22.02%
Semiconductor and other electronic component manufacturing	334400	2.04%	7,131	6,857	-3.85%
Employment services	561300	1.79%	6,250	8,701	39.22%
Self-employed workers, primary job	000601	1.71%	5,974	7,001	17.19%

Top Industries for Computer Programmers

Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Computer systems design and related services	541500	30.52%	132,767	143,405	8.01%
Software publishers	511200	4.26%	18,545	19,103	3.01%
Management of companies and enterprises	551100	3.78%	16,457	15,177	-7.78%
Colleges, universities, and professional schools, public and private	611300	3.67%	15,950	14,275	-10.50%
Employment services	561300	2.94%	12,805	12,965	1.25%



Professional and commercial equipment and supplies merchant wholesalers	423400	2.83%	12,306	11,476	-6.75%
Self-employed workers, primary job	000601	2.61%	11,368	9,689	-14.77%
Data processing, hosting, and related services	518200	2.38%	10,362	11,206	8.15%
State government, excluding education and hospitals	929200	2.14%	9,330	7,325	-21.50%
Management, scientific, and technical consulting services	541600	1.92%	8,356	11,933	42.82%
Federal government, excluding postal service	919999	1.89%	8,206	6,206	-24.37%
Local government, excluding education and hospitals	939300	1.65%	7,193	6,464	-10.13%
Direct insurance (except life, health, and medical) carriers	524120	1.41%	6,151	5,143	-16.38%
Depository credit intermediation	522100	1.31%	5,698	4,648	-18.44%
Self-employed workers, secondary job	000602	1.31%	5,682	4,525	-20.36%